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[OFFICIAL NOTICE.]

The Ninth Annual Meeting of the Western Gas Association.

SECRETARY'S OFFICE, WESTERN GAS ASSOCIATION,
QUINCY, ILL., April 10, 1886.

The Ninth Annual Meeting of the Western Gas Association will be held at the Neil House, Columbus, Ohio, on the 12th, 13th and 14th days of May, and it affords your Secretary no little pleasure to say that, if one can judge from present indications, our approaching convention will be one of the very best, pleasantest, most profitable and largely attended meetings of the Western fraternity that has ever assembled.

It is to be hoped that our members generally will not be slow in availing themselves of the reduced transportation rates, which have been conditionally secured, as per announcement in the last issue of the JOURNAL, but will at once write to the Secretary for their necessary certificates. Do not wait until the allotted time for so doing has nearly expired, but kindly take immediate action. These reduced fares apply to all who may attend our Columbus meeting—to their families, and to members of kindred Associations throughout the country.

Your Secretary again requests, yea, implores, each and every member whose intention it is to present a paper at our forthcoming reunion to notify him at once of the title of his contribution, so that a complete list of the subjects of the essays may be published in the next issue of the JOURNAL, which will be the last that can reach our members before the convening of our Ninth Annual Meeting.

The Secretary will be pleased to forward application blanks, and impart such information as may be solicited, to those who are desirous of joining our ranks on the occasion of our approaching meeting.

Respectfully,
A. W. LITTLETON, Sec'y.

ANNUAL MEETING OF THE GUILD OF GAS MANAGERS.

The annual meeting of the Guild was held in the Society's pleasant quarters in the Mason Building, on Kilby street, Boston, Mass., on date of Saturday, March 13th. A large attendance responded to the Chairman's call for order, and the business portion of the session was mainly devoted to the consideration of routine matters connected with the executive and financial phases of the Society's being. The annual election resulted in the reappointment of the retiring board of officers. The following list reveals the names of the gentlemen who were chosen to succeed themselves:

President—A. B. Slater, Providence, R. I.
Vice-President—R. B. Taber, New Bedford, Mass.
Treasurer—John Andrew, Chelsea, Mass.
Secretary—E. G. Pratt, North Attleboro, Mass.

The reports handed in by the different standing committees show the solid basis upon which the Guild rests; and evince the deep interest taken by the members in forwarding the objects and aims of the Society. The Guild's proceedings throughout the year have been of great value to those who had the privilege of participating therein; and it is a pleasure to add that its past records are the lights which may be safely trusted to illuminate its future pathway. During the year now closed many valuable papers were

read before the Guild, and the only complaint we have to make is that a greater proportion of them were not forwarded to the JOURNAL for publication.

With the termination of routine business the guests and members—and we may note that the former included the President-elect of the New England Association, Mr. Jno. P. Harbison, as also Messrs. Hallett, Norton, and Tarbell—devoted themselves to the demolition of one of chief-steward Jno. Andrew's inimitable "spreads." It goes without saying that the "feast" was perfect. How could it be otherwise with Brother Andrew in charge of the details? Owing to the illness of President Slater, who was suffering from an aggravated cold, Vice-President Taber was called upon to do the toasting; and the New Bedford gas man "browned" things up in fine style—on both sides, in fact. His strictness was such that not a single man escaped the ordeal; and rumor hath it that some "maiden efforts" were scored in consequence.

THE REAPPEARANCE OF THE CLOWNS.

With the springtime comes the circus; and with the circus comes the clown. It matters not how severe the rigors of winter may have been, nor how badly last year's tenting season turned out in the matter of "starving business," as evidenced by a woeful paucity in the number (to say nothing at all about their weight) of Bland dollars received—as per the returns of the genius who presided, with such consummate grace and all-conquering vigilance, over the destinies of the wagon devoted to the sole uses of the box-agent—the tender showers of April never yet failed to blot out the memory of past reverses from the mind of the circusman; and by the time that the May flowers bloom the tentsman is once more *en route* to the cities and towns which he has placed on his list. As it is with the circusman so also is it with the gas reformer—and more particularly so with that individual who honors New York City by living therein. The metropolitan gas reformer is a host in himself—he is proprietor, boss canvasman, advance agent, paste pot brigade, treasurer, clown, acrobat, equestrian, and menagerie, in short he is a whole circus in one person; but if we were obliged to specify in what particular branch or qualification of all those enumerated he most excelled we would unhesitatingly announce the opinion that as clown he was superlative—exceeding in that capacity because he is "so original" in his antics. At any rate just about the time that Mr. P. T. Barnum arrived in New York City the gas reformer also gave strong evidence that the hour for emerging from his winter quarters had made its appearance; and he "emerged" forthwith. The flapping of the canvas in the legislative halls at Albany had been heard for some time, and the records of the early doings of the Solons (in the shape of the presentation of "bills to regulate the manufacture and sale of gas") already looked somewhat like the "dead walls" and fences of the vicinity, for the latter were covered with divers highly colored "four sheet posters, done in six colors," although candor compels the statement that the legislative records were done in plain black ink. The "flapping" and the "posting" finally awoke (to "fierce desire and ardent yearning for the public good") the all-comprehensive (?) columns of the New York *Herald*, and the sluice gates of buncombe were hoisted. Its advance agent at Albany, sniffing an easy way to compile his budget of trash for transmission to the Monday issue of his polo-playing, non-duel loving employer's "organ," overhauled the legislative records and, as the result of his first "skimming" on the gas question, made up two and one-half columns of trash which he christened "The Battle for Cheap Gas." It would be useless here to attempt to give a *resume* of the various gas measures so far introduced at the present session of the State Legislature. Other years have been thought prolific in such births, but the present session beats any one of its predecessors many times over. They are of all sorts, as will naturally be concluded; and not one of them is worth the consideration of any legislator who is possessed of an honest wish to do justice to the perplexing conditions involved in the questions sought to be adjudicated upon.

Aside from the question of legislation, which is not the primal object of these few comments on circuses and clowns, the next weekly gas blast of the *Herald's* "special commissioner" was belched forth on date of April 12th, and its "intense temperature" penetrated into the cave in which the boss gas reformer had been hibernating. We hardly think it is necessary to name him here; but for fear that his fame may not yet have reached to Tasmania (we received an order not long since for a subscription from that point) we beg leave to present that combination of letters which betrays the personality of John H. Sherwood. Rushing into print in the columns of that *Journal* whose advertising pages are and have been avenues of revenue to the brothel keeper and the charlatan, he chants his clownish rhyme. Introducing his theme by congratulating the "Editor of the *Herald*" upon the "clearness and correctness" of the work of the aforesaid Albany correspondent, he then jumps into the ring and tells his little joke—the same old howl that he has indulged in for years, "just like they do in the circus, you see." Listen to him: "The responsibility for the systematized plundering of our citizens rests upon the shoulders of a few of our most wealthy men, who are unscrupulous enough to use their ill-gotten gains to corrupt and buy special legislation at Albany. If these men had a decent regard for the good opinion of our honorable citizens this outrageous monopoly of one of the necessaries and comforts of life would cease at once. The methods of the gas monopoly are not one whit more manly and honest than those of Mr. Jacob Sharp in the manipulation of the Broadway railroad franchise. The gas ring have extorted dollars from the gas consumers where Sharp gained pennies by his shameful scheme." Wonder what our clown means in the concluding portion of that sentence? However, the jester thus continues and concludes, "* * If the monopoly is continued a band of insolent sharpers" (wonder if that is a pun? you can't always tell when a clown makes a hit) "will continue to pocket that sum" (he means over three millions of dollars) "in addition to the 30 or 40 millions of money they have already extorted from the people above what would have been a fair price for gas under a fair, honest competition during the last thirty years." Say, for instance, like the system pursued in renting out the clown's building which is devoted to the housing of artists? He only maintains that building because he desires to furnish comfortable quarters to struggling artists? His man Friday (H. E. Tremaine) appears to be fitting himself out to take the chief's place in the ring in case the latter should become temporarily disabled through too severe a stroke of the ringmaster's whip; and we would judge so from reading (also in the poloist's organ) the following echo of the clown's voice: "It is natural that misrepresentation and deceit should be resorted to by the wrongdoers to mislead the honest members of the legislature, and to turn the wave of popular opinion to the gas c mpanies' advantage. Such an effort should intensify the scorn of public indignation against the sweet-faced hypocrites who would delude the public to buy their worthless stock, and who charge extortionate prices in order to pay dividends on it." Well said, for one who at the present time must be content with second honors in the ring.

After reflection actually leads to the harrowing thought, can it be possible that the clown is out of his mind, and that his wail is but the utterance of one in frenzy wallowing? Indeed, we fear it; for has it not been said, "Whom the gods would destroy they first make mad!"

MR. FORSTALL ON CERTAIN PORTIONS OF THE SUBSOIL OF CHICAGO, ILLS.

Mr. Forstall, of the Chicago (Ills.) Gas Light Company recently "spoke his mind" in regard to the manner in which the authorities of that city "make" high ground out of low levels. His objections, and they will find an echo in the mind of at least every member of the fraternity who operates in a large city, are thus set forth:

"There is hardly anything from which iron pipes suffer so much as from coal ashes. We have had to fight this trouble ever since the original level of Chicago was raised. You know that when the present system of sewerage was put in the surface was raised some 12 feet in order to get a flow. This necessitated a large supply of filling matter, and the city used everything it could get. A large quantity of ashes, the debris of burned buildings, was used; old tin, hoopskirts, decayed vegetable and animal matter—in fact everything was fish that came to the municipal net. Back in 1850 we laid pipes in the clay which ran under the prairie black earth, and to day they are as sound as ever. Pipes laid in the ash filling are eaten through after eight years of duty. Not long ago we took up a half mile of pipe in Sedgwick street which was literally honeycombed by the ash drippings. We tried a great many schemes. Coating the pipes with pitch answered for a while, but the only stable way of remedying the thing is to make an artificial soil of consistent clay. The pipes that have been subjected to the action of coalashes present a curious appearance. In some cases they are dry and brittle and peel like an onion, while in others they are soft and half flexible. Where the water, after making its way through the ashes, reaches them drop by drop they are found perforated through."

ELECTRIC LIGHTING IN ITS PRESENT CONDITION.—Dr. N. H. Schilling's Munich report on this subject, as promised by ex-president Greenough in his address to the New England Association last February, is now on sale in Boston, Mass. Messrs. Cupples, Upham & Co., of Boston, Mass., are the translators and publishers. They have done the work admirably.

Dr. Schilling brings to his review of the subject that careful studiousness which is characteristic of all his work, and his temperate review of electric lighting, in so far as the latter may be looked upon as a possibly important competitor of gas in the general field of artificial illumination is concerned, is well worth perusal. The Boston publishers before mentioned will supply copies of Dr. Schilling's work; and Brentano Bros., of New York city, also hold themselves in readiness to furnish copies. We are unable to state the price, but believe the figure is not a high one.

[Official Report—Continued from page 191.]

Sixteenth Annual Meeting of the New England Association of Gas Engineers.

Held at the Narragansett Hotel, Providence, R. I., Feb. 17 and 18.

First Day—Afternoon Session.

THE QUESTION BOX.

The President—Having exhausted the papers, we will now take up the questions. The first one is—

"Has any member of the Association personal knowledge of a gas explosion in any room situated above the basement floor?"

The President—I think I know why that question was put in. The experiments made by the gentlemen last year on the subject of water gas, and also the experiments which we ourselves made at Boston this year (as to the quantity of gas that can be run into an ordinary room with windows in it), are so extraordinary in their results, in regard to the small amount of gas that can be kept in such room, that I think it extremely doubtful whether an explosion can be got in an ordinary room, except under very unusual circumstances. Looking back upon our own experience in Boston, it was found that almost no explosions had taken place except in cellars. At the present time we are being sued for an explosion that occurred in the second story of a building, but which we do not think was caused by the escape of gas. I would like to know, as matter of fact, whether there are any gentlemen present who ever had gas explosions to occur in the upper portions of buildings located in their towns.

Mr. Thomas—Such an explosion is reported to have occurred in Williamsburgh on the morning of Feb. 14.

The President—Under what circumstances?

Mr. Thomas—The first floor of the house was divided into a store and sleeping rooms—the latter being in back end of premises. The supposition is that the gas was not properly shut off by the clerk or porter who closed the premises when the day's business was ended. Next morning the one who opened the place probably carried a naked light, and so brought about the explosion. Perhaps a year ago a somewhat similar explosion occurred in Williamsburgh. The owner of a shoe store occupied the rear rooms as a lodging place for himself and family. The rear rooms were separated from the shop by a high partition, and I presume there were only two windows at the rear of the building. The explosion occurred in the store, and was caused by a lamp that had been carried into the shop from the rear rooms.

The President—I would like to ask whether the store was on a level with the street. If so, the gas could have leaked in from the street main.

Mr. Thomas—The shop was level with the street—possibly 5 or 6 inches above it. On the day before the shopkeeper had ordered a meter to be set, but the gas company had not been able to finish the job. The inlet pipe to meter had been placed, and the supply cock was simply turned off. How it had been reversed is not really known, but it is supposed that the shopkeeper (he had but just moved in) turned the meter cock and tried the lights only to find that they would not burn, and then neglected to shut the gas flow off properly. He went back to the sleeping room, most likely closed the door in the partition, and permitted the gas to escape into the shop until the next morning. Upon rising he probably visited the store and carried a naked light, with the result above indicated. I suppose the opening left in the stopcock might probably be one-quarter of an inch in diameter. At any rate there is no doubt that a large quantity of gas escaped.

The President—Of course I do not mean to say that I have any doubt as to its being possible to produce such an explosion. My attention was called last year to an explosion which took place in Cambridge, Mass. Some students, who had been indulging in sports in Boston which had rendered them somewhat hilarious, on their return home amused themselves by breaking up a considerable portion of their furniture, and then concluded that a good way to put the gas out was to unscrew the chandelier—which they did, and then went to bed. The smell of gas being found rather strong in the vicinity, some of their neighbors (carrying a light with them) broke the door in; and the result was an explosion which blew out the windows and naturally disturbed the people who were near by. Of course it is possible to produce an explosion if you put enough gas into a room; but what I want to know is whether (with the ordinary leaks) there is any knowledge on the part of any member of this Association of a gas explosion that has occurred in an ordinary room upstairs.

Mr. Harbison—A few years ago a leak occured in one of our Hartford lodging houses, and the gas poured into one of the rooms for some little time. When the occupant reached home he detected a smell of gas. He found that his burner was shut off. He then procurred a light and started out on an exploring expedition. He applied the light at the point where the bracket came out of the wall, and the exploration terminated. There was, however, an immediate demand for physicians, masons, joiners, and paperhangers. It was found, when the place was examined, that the pipe leading to the bracket had split. The explosion took place in the wall. That is one instance. Another case took place in a new building. The occupant had a meter set, and the plumber came to make the outlet connection. He did not use the precaution (which he should have done) to see that all the outlets in the various rooms were capped; but he found out afterward that one of them had been neglected. No fixture had been put on, and the ¾ opening allowed the gas to pass out so rapidly that the room was soon filled. Before he got fairly out of the building—perhaps in the course of an hour from the time the gas was turned on—the occupants of the house complained of the odor, and the plumber was called back. He visited the seat of trouble, carrying a light with him; and when he entered the room which contained the uncapped service an explosion took place, and much damage was done. He wanted to have it appear that the gas people were to blame for not seeing to it that the outlets had been capped up. We disputed the claim. A suit was brought, but it never came to trial.

The President—Of course, with a ¾-inch opening into the room, a large amount of gas could be admitted; but that is not a probable case.

Mr. Harbison—The gas had been escaping for perhaps an hour. The room may have been 8½ feet in height. The only other "above the basement case" that I know of was this: One of Smith & Sayre's men came to repair one of our exhausters, and, acting under the direction of the person who was then superintendent at our works (he continued in that position for about six weeks from the time he came until we invited him to leave the town) he placed a light inside of the exhauster about half an hour after its end had been taken off. Quite a bill for repairs had to be attended to very soon afterward.

The President—I fear that I will not get much satisfaction out of this company. I do not doubt that you can create an explosion inside of a cast iron exhauster; and I do not deny that if you run a ¾-inch uncapped pipe into a room you can get an explosion. I can only say that in running 600 feet of gas into a 1,200-foot room we could not get an explosion. I do not mean to say that any man was fool enough to go into that room with a light; but we took samples of gas out of it which we tried to explode. We found that we only got 8 per cent. of gas at any time. There is a suit now being brought against us for what they claim was a gas explosion; but I do not believe it was. In our experience we have never had an upstairs explosion from a small leak of gas. Unless I can get some further information out of this Association I shall feel confirmed in my previous opinion that such explosions are certainly very uncommon. I am waiting to be instructed.

Mr. Stedman—Did you take the sample from near the ceiling of the room?

The President—Yes.

Mr. Stedman—And the most you got was 8 per cent.?

The President—Yes. I did not do it myself, but had it done. The next question is—

"What is the best policy for a gas company to pursue, in view of the introduction of the electric light? Should the electric light be treated as a competitor, or as an educator of more light?"

I expressed myself on that subject this morning, and shall now be glad to hear from others.

Mr. Stiness—Mr. President, this morning when moving the thanks of the Association for your address, I felt that I was fortunate indeed in having the support of so worthy an associate as yourself regarding our position in the matter suggested by the question just read. I have long fully believed (and those who know me best will remember I have maintained the opinion) that we to-day should be artificial light companies instead of gas companies. There is no doubt in my mind that electricity will furnish an artificial illumination which will be long continued. The science of the Nineteenth century will not allow it to go out of existence without its having had a perfect and thorough trial. I believe outdoor arc electric illumination is a fair success. As witnessed in this hotel, however, we are convinced that the incandescent system is not perfection; and I think a long distance remains to be traversed before the incandescent light can in any sense be considered as a competitor to gas. A vast improvement will be made in it yet. As our President said this morning, gas companies situated like those which he mentioned—where no rival electric lighting companies are in the field—could furnish their consumers with either gas or electric light; and, in my opinion, reap a profit in both cases. As I said this morning, I think Mr. Harbison's figure (when he named five years as the period between us and dollar gas) is too great. I believe some of the companies will reach the dollar point within that time; but aside from this, and to return to the question last read, I believe that the introduction and management of electric companies should be under the control of the gas companies.

Mr. Harbison—I must take issue with Mr. Stiness as to some of his remarks. I agree with him that the gas companies ought to furnish the artificial light supplied in cities and towns; but I further believe they should also be gas light companies. If the same ratio of advance in the manufac-

ture and distribution of illuminating gas is kept up during the next decade, I believe that gas will be the chief artificial lighting agent used. Kerosene will have, to a certain extent, its field beyond the gas district; but I do not believe the electric light will or can, at the end of that decade, be in any sense considered as a competitor of gas. I deny that the arc electric light is a success as an agent for outdoor lighting. I believe it has been fully demonstrated in the city of Philadelphia that gas is better than the electric light. It is matter of record that, after a most severe test, high power gas burners displaced the electric lights formerly employed on Rittenhouse Square, to the great satisfaction of everybody in the Quaker City—excepting the managers of the electric lighting company. I do not agree with Mr. Stiness that gas companies should also control and operate electric lighting plants; for they may have to charge a rate for the electric light that will prevent the putting out of their gas lights and the substitution of the electric light. On the other hand, if they charge more than gas would cost—*i. e.*, if they supply the electric lights at a figure which would enable them to make money on the service—they will have competing electric light companies in upon them. If a gas company can charge a sum for its electric lighting business which will make that business a source of revenue instead of loss, then it will have competition from other electric light companies—just as gas companies that have charged excessive prices for gas have experienced. Rest assured, the electric light people will be apt to learn that you are selling electric light at a profit; and they will want to share it. If you reduce the charge for electric lighting to such a figure that they cannot come in with profit, then you will lose your gas business, which is now paying you something. Where, then, is to be the gain. Show me the advantage that will accrue either to the public or to the stockholders of the gas company, if the latter furnishes electric light at a lower figure than the electric companies can supply it, if by so doing we are to lose the gas business (at which we are now making something), and at the same time receive no profit from the new venture? We will have the additional care and responsibility, also the additional wear and tear—which foot up a considerable account in the end. I think it is the duty of gas companies to confine themselves to the legitimate business of making and selling gas; and if we could all attain to the standard of results enjoyed by Mr. Stiness, at the Pawtucket gas works, we need have but slight fear as to the outcome of electrical competition. When I am situated so that I can get results equal to his (if I had a retort house such as he has—I hope to build it before a great while), I shall feel that I am near solving the problem of how to sell gas at $1 per thousand, and still pay my stockholders their eight per cent. I think Mr. Stiness already knows how he can sell gas at $1 per thousand and pay his stockholders eight per cent.; but perhaps he has too much sympathy with his nearby brethren to come down to that point just yet.

Mr. Stiness—Brother Harbison says that electric lighting is not within the province of gas companies; but what is gas? The plainest definition of gas is that it is "light;" therefore gas companies are lighting companies. Mr. Harbison will arrive at my level as sure as the years roll round; and it is equally sure that the electric light will be used (as our President says) by people as a luxury. I have in my mind a place in this city of Providence where incandescent lights are used, and where they would continue to be used if the price of the light were even double that of gas light, simply because at certain seasons of the year it is desirable that the storekeepers should keep their premises cool. Let me say to Mr. Harbison, and to the other gentlemen of the Association as well, that the electric light has come to stay. A wink will not hide the fact from our sight. But even though it is here and likely to remain, I think the gas companies can manage it so as to be able to supply it to those who want it.

Mr. Harbison—Permit me a word or two further on the question of ventilation. At the present time I believe the Siemens gas burner can be depended upon to afford a more perfect ventilation in a room than could be obtained were that room lighted by electricity. I saw those Siemens burners at Bradford (Pa.) and perhaps some of our members who were in that city last spring beheld the same arrangement. The ventilation of the room was perfect; and the atmosphere was in every way most desirable. I believe that with proper attention paid to our gas burners this ventilation bugbear may be disposed of satisfactorily—in short, watch carefully over your methods of burning, and you will find that gas will furnish a much pleasanter light than that afforded by any electric light of the present or future.

Mr. Thomas—The system of ventilation spoken of by Mr. Harbison has been carried out in New York city, at the Manhattan Company's office, for several years; and by it perfect ventilation is secured. I do not agree with Mr. Stiness in the view that electric lighting has come to stay. It will only stay long enough to pay us a visit. In Europe it has been unsuccessful. It is with us in New York city; but a simple computation recently made shows that were the sum which the authorities propose to pay for electric lighting applied to gas lighting they could with it maintain about 18,000 gas lamps, each burner therein being rated to consume six feet per hour. In the city of Brooklyn I believe they are putting up electric lights on every convenient post; but they are constantly "shinning" up the poles in the attempt to fix the carbons. It is no unusual thing (in fact it is of frequent occurrence) for the lights to remain extinguished for an hour or two at a time. Brooklyn is supplied with "low power" arcs at an annual charge of about $150 each, and one arc displaces not over five gas lamps, the latter costing at the rate of $19.80 each per annum. The Brooklyn system of electric illumination does not possess a redeeming feature. It is costly and inefficient. No doubt electric lighting is considered a luxury by some; but their number is not very formidable.

Mr. Taber—I must acknowledge that I am "young" at the gas business; but I think the electric light, having made its appearance, is quite likely to crop out, like almost everything else, where you lea t want it. I have watched its progress in New England cities during the last two years; and many members of our Association who once told me that electric light would never shine in their towns have it to-day as a competitor of their gas lights. Within the last few months a new Edison company has been started in New Bedford. They are there, and I think they have come to stay. I do not think that their lights will be of any benefit to our city; but I have no doubt we will feel their presence in one way or another. In view of this the only question for us to consider is how to deal with it. Shall we use it as a competitor, or as an educator? As to crowding it out, I hardly think that could be done. Shall we then treat it as a competitor, or shall we take hold of it and push it forward? Shall we take it ourselves, or give it to someone else—to some other company which will offer, as has been done in our city, to supply electric light at a rate 20 per cent below the previous year's gas bills? I think the wiser plan will be not to try to stifle it, but, if possible, to control it.

Mr. Nettleton—Down in Connecticut we all try to live together in peace and harmony—in the gas world at least; and, generally speaking, ideas which radiate from Hartford are implicitly believed in and become the ideas of the rest of the managers of the gas companies. But, in this particular case, I must beg to differ from my brother Harbison; and, judging by my own experience before I had any electric lights and afterwards, I think you would all feel very much as I do. It makes a great deal of difference whether you view the electric light as your own property or as the property of some one else. I think if Mr. Harbison had the management of the Hartford electric light company he would think it was about the best light for the streets of that city that ever had been made.

Mr. Harbison—No, I would not.

Mr. Nettleton—The company that I am connected with has put in an electric light plant during the last year, and from the moment that it was decided upon I have never had occasion to regret it for an instant; but I have been very glad of it. It has made my life during the past winter (when people were dropping off from gas and putting in the electric light) very much more comfortable to know that the money they were paying for the light was coming into the hands of the gas company, and not going to someone else. I agree with Mr. Stiness that we ought to be distributors of artificial light rather than of some particular form of light. I fully believe that the electric light has come to stay, in some shape and in a limited form. I question very much if the improvements will ever be great enough to induce its general use in the same way that gas is used; but that it is to be placed on the principal business streets of all our cities and villages I do believe. I think that in certain classes of stores and factories the arc light will continue to be used; and that, in some cases, the incandescent light will be distributed. How extensive will be its use, time alone and the improvements to be made in it will determine. If they can get to a point where they can make storage batteries a success, so that we can have electricity stored just as we have gas in a holder, and can pump the electricity in with some small power during the 24 hours of the day, and use it out just as we use gas out of the holder—sending out large quantities at once—then it will become a powerful competitor of gas. It seemed to me that in the case of my own company the chances of the increase of the electric light business were sufficiently great to warrant the expenditure of the small amount of money required to start a plant, and we could not afford to take the risk of losing the control of the business. We have put ourselves in the position of furnishing light, and if electric light is needed in place of gas, we are in a position to supply it.

Mr. Crafts—What was the expense of your plant?

Mr. Nettleton—About $8,500.

Mr. Crafts—What is the price charged?

Mr. Nettleton—The price averages $75 per year per lamp.

Mr. Crafts—How many hours of burning?

Mr. Nettleton—We have a scale of prices varying from $60 to $100 according to the length of time the lights are used. The average is about $75 per year each. I must say that our lamps burn very steadily—when there is no trouble with the power, which in our case is water.

Mr. Coggshall—If you were running by steam power would the electric light afford a profit at the prices named?

Mr. Nettleton—I cannot say; but I think not.

Mr. Harbison—The owners of an electric plant, operated by steam power, in Hartford, furnish arc electric lights at a charge of $50 per annum. They remain lighted until 9 o'clock each evening. If friend Nettleton gets $75 for those same lights it will not be long before he has a competing electric light company at Birmingham. That is just what I claim. If you obtain a price for the electric light which will compensate you for wear and tear, labor, and interest on investment, you will have competitors; and then how have you bettered your position? You will have to cut down your prices in order to retain your business. I think Mr. Nettleton will find it out so before he is much older. If the people of Birmingham are willing to pay such a rate for light, he will find that there are other people in existence who will desire to compete with him.

Mr. Crafts—What are Mr. Nettleton's figures as to the expenditure of power necessary to maintain an arc light?

Mr. Nettleton—Each arc light requires one horse power, and a divided arc lamp is said to take one-half horse power.

Mr. Crafts—Is there any difference as to the power required for a lamp one mile distant from the dynamo as against one say a quarter of a mile away from it?

Mr. Nettleton—There is a little difference according to the length of the circuit. It will take a trifle more power, or rather you will lose more electricity, on a long circuit than you will on a short circuit. It makes no difference, I think, on a small circuit—one of say three miles; but there is a difference when the circuit is over 7 or 10 miles in length.

Mr. Crafts—How does the damp weather affect it?

Mr. Nettleton—I have seen no difference.

Mr. Crafts—How do you rate your candle power for the divided arc light?

Mr. Nettleton—They are rated at 1,200, but they are not; I presume they are in the neighborhood of 300 candle power.

Mr. Taber—While I strenuously advocate that all our gas engineers should become thoroughly acquainted with this matter of electrical lighting, I hope the subject will not be so engrossing as to give the impression that we are spending our time in investigations over electricity and its supply.

The President—I think the point is properly taken; but at the same time the question is what, as gas engineers, shall we do for the interests of the gas companies in whose service we are. If it is for their advantage to supply the electrical light, or kerosene lights, or anything else, then it is our business to discuss such questions here. I hardly think it necessary for me to say, after what I said this morning in my address, that I do not agree with Mr. Harbison altogether about the electric light. Mr. Thomas has referred to the condition of the electrical lighting business on the other side of the water. It is perfectly true that in London and in Paris the arc light has practically been driven out by gas; but he must remember that in Paris the arc light has really never had a show. The only light they have had there has been the Jablochkoff light, which has not been as brilliant as the other lights. And besides, in Paris the municipality is interested in using gas. In London the competition with gas, which is furnished at half the price at which gas has sold in this country, is not so great; so they can afford, of course, to put more money into their gas lights. At the same time it is also true that there is not a street in London that is lighted as our thoroughfares are lighted here in America. The electric light (not only the incandescent but the arc light as well) has filled a place in the lighting of squares which cannot be filled by gas at any price. And, as far as the incandescent light goes, that also has made great progress abroad. I looked into the matter a good deal during a visit which I made there this summer, and I heard but one opinion amongst the careful lookers on, who were not interested in either light; and that opinion was to the effect that the incandescent electric light had got a future, and that there was a business in it if properly run. I saw one place this summer which was lighted by 5,000 incandescent lights; and a most beautiful illumination it was. It gave the utmost satisfaction to everybody who saw it. It was used in the Exhibition of Inventions; and they would not allow a gas lamp in the place—they were so afraid of there being some possible accident by the use of gas on the premises that they preferred to light with the incandescent light, at any price, rather than to have the gas light put in. One of the gentlemen with whom I was conversing about the matter had had it in the composing room of his printing house, but was obliged to give it up because he could not get it from the people who had previously supplied it; and he said that the loss to his business—in the feelings of the people who were at work there—was unquestionably very great; and that his foreman came to him and said that even if he had to pay for it several times over what was paid for gas they would prefer to have it in there. That is the case not only in England, but also, to some extent, in this country. It is all very well to say that the Siemens light can be made to ventilate a room better than electric light. So it can; but if a man wants to ventilate his room with that light he must put a flue in his ceiling, or make some arrangement to get to the chimney, and go to a considerable expense; whereas he can have the incandescent light put into his office with no trouble whatever, and sometimes with a very marked improvement in the condition of the atmosphere. I do not wish to be understood as saying—and I very carefully hedged what I said about the present condition of electric light—that it is in a thoroughly satisfactory condition at the present time. There was recently a case in Boston, which was brought to my attention the other day, of a man who had an electric light in front of his store in Washington street. The light went out on two different nights, and his store was broken into and robbed each time. He thereupon came to our office and proposed to put up a 30-foot gas burner on a lamp-post, in order that he might have a light that he could depend on, and which would not go out. The only theater in Boston which was lighted by the electric light has abandoned it and gone back to gas on account of the economy. There is no doubt about those facts. But, on the other hand, here is a business to be looked after, and it is a business which has got to be done by somebody. I do not believe that Mr. Stiness is far wrong; and I do not believe that Mr. Harbison can afford to pooh-pooh the whole matter. If there is nothing more to be said on this subject I will pass to the next question. It is—

"What is the cause of the caking of lime on the bottom of the first tray in the purifier (so that the gas will not pass through) before the gas shows any traces of sulphur; and the remedy therefor.

Mr. Nettleton—The question was not asked by me, but I have had a very disagreeable experience this winter from just this very thing; and I would like very much to know its cause. The boxes have caked up badly, or at least have not allowed the gas to pass. I think that in the month of December there were twenty boxes changed when there should have been but six. The trouble would come right along, taking one box after another in regular order. We would shift a box in the morning, but before we could get one emptied and filled and turned on the first box in the next series would be stopped. One day four boxes were emptied and three filled and turned on, all because of this trouble. I supposed it was due to using stone lime that had not been properly slaked. At all events the trouble ceased on our commencing to use oyster shell lime, with the addition of a portion of sawdust or breeze in the bottom layer.

Mr. Spaulding—At the Brookline works we have experienced trouble similar to that recounted by Mr. Nettleton. We had been using shell lime in the boxes; but last December the material was hard to get, and we then tried stone lime. During December and January we shut off about double the number of pans that would have been closed were we working on shell lime. We did not have this trouble when using the shell lime.

Mr. Rollins—I may say I have had trouble similar to that noted; but in regard to the statement that it can be traced to the use of stone lime let me mention that a gentleman with whom I talked on this matter a day or so ago asserted that shell lime was the cause of the difficulty. My friend said he would change back to stone lime. The remedy adopted by me was to mix breeze in with the lime. When the boxes were charged with that mixture the trouble ceased. At one period the trouble assumed such proportions that I had to remove the lime from the purifiers, throw it out on the floor, and allow it to stand for awhile before putting it back again. I attributed the source of the difficulty to naphthaline.

The President—To what cause does Mr. Gerould attribute the caking of the lime on the bottom of the first tray in the purifier? Mr. Nettleton thinks it is due to the use of stone lime; and Mr. Rollins believes it is due to naphthaline.

Mr. Gerould—I would very much like to hear the reason myself. I have here (showing a specimen) a piece taken from the bottom tray in one of the boxes.

The President—What is that black stuff?

Mr. Gerould—That is the question.

The President—Is it not tar?

Mr. Gerould—There may be some tar in it. My trouble commenced about six weeks ago, at a time when I had started in to use new oyster shell lime. I could not run over 2,000 feet before back pressure would show.

The President—Perhaps Mr. Slater can give us some light on this subject.

Mr. Slater—We have had trouble of that sort this winter; but I have not been able to give it any personal attention. We have made daily changes of lime in two or three purifiers from that very cause. We are now using shell lime in both sets of purifiers.

The President—Has Mr. Gerould changed his method of manufacture in any way?

Mr. Gerould—In no way whatever. This trouble commenced just six weeks ago.

The President—Have you been getting an increased yield of naphthaline at your works?

Mr. Gerould—No, sir. We have not had any naphthaline since naphtha was used by us as an enricher. The piece of caked lime shown was taken from a 4-inch layer, and the "cake" covered the entire space of the bottom tray. I mixed sawdust with the lime, but perceived no difference. Knowing that Mr. Rollins had been bothered in this way, I wrote him for in-

formation as to the remedy he employed. He answered that a cure had been effected by spreading in a layer of breeze in each box. I put in six inches of breeze to each purifier. The first box so fixed ran thirteen days before back pressure was shown. The first tray of lime above the breeze showed the old obstruction.

Mr. Slater—We tried the plan of mixing in breeze and sawdust, but it did not seem to make any difference. The deposit comes and goes without any apparent cause. It is still a mystery with us.

Mr. Snow—We have had some experience in that line at Holyoke. We were loading up our trays rather heavily—spreading say six inches of lime on the trays—when the deposit or caking appeared. Then we reduced the lime thickness to three inches, and have had no trouble since. That was about three years ago.

Mr. Rollins—Did Mr. Slater notice whether any trace of naphthaline appeared in the lime when it was taken from the purifiers?

Mr. Slater—A slight trace of naphthaline would be occasionally perceived. It was in a very finely divided state. I may say, however, that naphthaline has been present in far greater quantities on other occasions when no trouble arose from back pressure.

The President—I trust Mr. Gerould has received a satisfactory explanation of his difficulties. In one of the first visits that I paid many years ago to General Roome, in New York, he told me that when he had been in the gas business for six months he thought he knew it all; but now that he had been in the gas business for forty years he had concluded not to feel sure of anything. At the time I thought it curious he should talk in that way. It really seems to me as if the more we study the business of gas making the less we get at all the points; for there are some things which seem to be utterly inexplicable. In regard to this very matter of the use of lime in purification, I may say that in our new works at Commercial Point we were finally driven to abandon it. We could not purify our gas with lime, no matter what we did. We used lime in all thicknesses, and mixed in various ways; but we had to give it up and go to iron. There seems to be a slight deposit all over the lime, which was more in the nature of soot than anything else. It would coat the lime all over, and the gas would not go through it. Nobody has been able to give us a satisfactory explanation of the trouble.

Mr. Gerould—Thinking that our use of naphtha as an enricher had something to do with it, we went back to cannel coal, but were worse off than ever.

The President—We had a great deal of trouble with naphthaline at that time. I simply mention that fact in case you do not find the information you get here entirely satisfactory.

Mr. Gerould—Last summer we ran purifiers for four months without changing, and the lime got so hard that it would have to be loosened with a pick; yet there was no trouble from back pressure.

Mr. Thomas—I think the trouble may be traced to improper washing. Purifiers will not of necessity show back-pressure even if there is a plenty of naphthaline in them; but I do know that where gas is crowded through the washers without coming in contact with a sufficiency of water, carbonic acid has passed into the first tier of lime and altered that tier into a carbonate. Some of my experience would bear that out. When we changed the purifiers the waste pipes were always washed out, and the wash water ran to the drip under the center seal, then flowed into the drain pipe that led the drip away from the other portions of the apparatus. After a short time one-half of that drain pipe was filled up with a deposit similar to that exhibited here. You could dissolve the stuff in sulphuric acid; but that was about the only solvent which could be found for it. I then changed the course of the waste pipes, and had no further trouble with them. Mr. Vanderpool had a similar experience* at his works. I think the trouble spoken of is largely due to improper washing. Too large a portion of carbonic acid goes on to the purifiers, and at the point where this excess first enters the boxes the lime is altered to a carbonate.

The President—We do not think it is due to lack of washing, but to want of scrubbing. In the first place, our gas is thoroughly condensed, then it goes through a standard washer, and goes forward to the purifiers in a very moist condition. It is full of moisture, and we do not get the results which we think we ought to get. We do not get the result which would be obtained if the gas went through the iron in a cleaner condition. We are preparing to scrub the gas, as well as wash it, if necessary, in order that we may get better results than those we are getting. It is possible the trouble may result from the presence of carbonic acid; but I think that that can be got out by washing as well as by scrubbing. I do not think that it is due to a want of water in the gas. I know it is not that.

Mr. Thomas—Where this trouble has frequently occurred I am sure that the purifiers will show tar. If the boxes are not changed rapidly the lime will be charged with tar, and the gas will be foul. I believe that Mr. Gerould is making a carbonate of lime in his purifiers.

* See Proceedings Society of Gas Lighting, 1877, paper read (Feb. 1, 1877) by Mr. Eugene Vanderpool.

Mr. Gerould—Do you suppose it would make any difference if fresh burned lime were used instead of lime that was, say, a year old?

Mr. Thomas—No, I do not think it would. I think if you stop the tar on the works side of the boxes that deposit will cease to bother you.

Mr. Slater—Lime has a greater affinity for carbonic acid than for sulphur; and in any event the sulphur will go on to the next purifier, while the former box will still be taking up carbonic acid. Suppose you have a carbonate of lime there, will not the gas pass through it? Mr. Forstall had the same experience.

Mr. Thomas—Where lime is mixed with breeze it is not solid.

The President—Why should it not be hard?

Mr. Thomas—It is not hard simply because coke breese is porous.

Mr. Taber—Does not Mr. Gerould's trouble partially arise from the fact that his gas is too moist, causing it to form a harder carbonate than usual—a scale, rather than a soft and spongy carbonate?

Mr. Gerould—I may say that I tried running the gas at a high temperature, but the trouble was not lessened.

Mr. Thomas—Have you found any remedy?

Mr. Gerould—No; and I have tried everything that I could think of.

The President—Then I do not see anything for the Association to do but to move a vote of sympathy with Mr. Gerould.

Mr. Crafts—Some two or three years ago I spoke about getting six cents a bushel for our refuse lime, and this we have done for a great many years. Neighboring gas men asked me if I could dispose of theirs, and I did sell quite a quantity of it for the Springfield company. Some farmers who have used that lime for twenty years are using it to-day, and with good success. Other farmers in the vicinity, thinking they must get similar results, applied to one man who had succeeded in bringing up some old worn-out pasturing lands (actually at one time covered with moss) for a few hundred bushels to spread over certain pieces of ground owned by them in close proximity to his. They failed utterly. Both parties to the experiment called upon me, reported their doings, and asked for an explanation. In response to a suggestion of mine the authorities of the Amherst Agricultural College analyzed the two soils with the following result: The soil which had been benefited by the lime application proved to be lacking in limey constituents, while in the other instance the soil carried plenty of lime. Hence the success and failure of the respective experiments. Having spoken of this at a previous meeting, I thought that I would state the result of the Amherst analysis.

[To be continued.]

[Official Report.—Continued from page 194.]

Second Annual Meeting of the Ohio Gas Light Association.

Held at the Arcade Hotel, Springfield, Ohio, Mar. 17 and 18, 1886.

First Day—Afternoon Session—March 17.

The following routine business was disposed of:

Report of Finance Committee.

The Finance Committee reported that they had found the Secretary's accounts in proper order, and sustained by the vouchers presented. No report having been received from the Treasurer, the Committee could say nothing thereon. The report was received and placed on file.

Report of Executive Committee.

This Committee reported in favor of paying the Secretary an annual salary. In the discussion which followed it was remarked by those engaging in the dialogue that, of necessity, the salary must be a small one, as the source of income of the Association was restricted to the moneys received for initiation fees and yearly dues. It was finally decided by vote that Mr. Butterworth's compensation for past year be fixed at $50; and that $75 be set apart as the salary, mileage dues, and hotel bill of Secretary for ensuing year.

Appointment of Special Committees.

Special committees here appointed were composed of the following:

On President's Address.—Messrs. E. McMillin, R. R. Dickey, and A. B. Robinson.

On Memorials.—Messrs. E. W. Hamlin, H. J. Reinmund, and J. Anderson.

On Place of Next Meeting.—Messrs. E. McMillin, A. S. Bushnell, and Jos. Light.

On Nomination of Officers.—Messrs. J. B. Smallwood, E. C. Gwyn, and H. Ranshaw.

The President here announced that the reading of papers would be taken up. The first in order was that prepared by Mr. Thomas Wood, of Sandusky, on the subject of—

THE FINANCIAL RELATIONS OF GAS COMPANIES AND CONSUMERS.

Mr. Wood read as follows:

Being, by force of circumstances, a very irregular attendant upon the meetings of this and kindred Associations, I am nevertheless deeply interested in their welfare and good results, and have read with much profit the papers and discussions as they appear from time to time in the pages of the American Gas Light Journal. Despite the number of times that the topic selected has been discussed, I nevertheless feel that the subject-matter of this paper has not yet been as thoroughly ventilated as it should have been—it being, in the writer's estimation, one of the principal (if not the master) keys to the vexed question of gas supply.

If the object of the meetings of this Association is to confine the discussions to gas making, then the question of gas selling is not one to be entered into here at this time; but is it not a fact that the successful financial relationship between gas company and consumer is the prime factor in the purpose for which gas companies have been organized—viz., as a paying investment?

Of course a company supplying a good quality of gas, and giving good service, will secure its reward over another company not following such a course, through having fewer obstacles to overcome when it comes to the payment for said service; and undoubtedly any discussion on new methods of manufacturing, purifying, or construction is a step toward making the payment for gas consumed easier and more satisfactory. But should we confine our thoughts to the manufacture of the article, and be silent on the selling question? I think not; and the intention of this paper is to direct the attention of, and draw out discussion from, the members present to the difficulties encountered and the ill-feeling engendered between the consumer and company over the payment of gas bills. I said ill-feeling engendered between the consumer and gas company; but in this I think I may have been wrong. I do not believe the companies (or rather their officers) as a general thing show any ill-feeling toward the consumer; and I rather think the ill-feeling is all on the side of the consumer. Nevertheless, the officer of the company suffers for want of confidence on the part of his patron, and certainly cannot feel other than badly over it. Smaller companies—say those sending out from twelve to twenty million cubic feet per annum (and I presume the greater number represented here to-day are in that category)—do not, as a rule, have a man to attend solely to their financial affairs; and thus it devolves on the superintendent or manager to bear the brunt of the consumers' attacks. Consequently it becomes necessary that all the qualifications of the successful, practical manager, and financial officer as well, shall be vested in a single person—qualifications, it is needless to add, most difficult to combine in one personality.

Taking it for granted that a company is selling its gas at the lowest possible living price, still there are difficulties to contend with in the collection of bills. These difficulties may assume various shapes, such as distrust as to the method of measurements, etc.; but they all trace back to a lack of that confidence which usually exists between buyer and seller in other branches of business or trade.

My motive in making this the subject of a paper is to see what can be accomplished toward smoothing over in some degree the rough road traveled by the average gas superintendent—more especially of smaller companies—and to discover if some plan may be found to secure the confidence and good will of the community in which he operates. No such superintendent lives who will deny that these things are more essential than any others to insure successful financial results to his employers.

Commencing with the meter—that great stumbling block and bone of contention between gas companies and their patrons—can anything be done with it to mitigate our worst troubles? Is it a reliable measurer of gas at all times; or is is liable, like a clock or watch, to get out of order? Our consumers would unhesitatingly condemn it; but we, as gas men, know a meter to be reliably correct, even after years of diligent service. Still, how can we cause our customers to feel the same reliability in its measurements? Some may say it cannot be done; but, in the first place, we can make an earnest effort in that direction by bringing it from its present hiding place in the cellar, and relocating it where it will see the light of day, as well as its own light, which it so faithfully measures at night. Then comes in the query, Is the gas meter, as now made, a sufficiently ornamental piece of mechanism to lodge it in a conspicuous place? I think not; and even were it brought out into the light its dials are so diminutive that they cannot be read at a distance of four feet. Supposing the faces of our clocks were made as small as gas meter dials, should we not consider them ridiculous? Why not have a meter with some traces of ornamental design about it, so that it will not be a disgraceful sight when conspicuously placed? Why not have its dial or dials of such proportions that a consumer may consult its record of measurements as freely as he refers to his clock dial to determine the hour of the day? Another feature of this ideal meter. It should bear the seal of the State Inspector in a conspicuous manner, after the fashion of the marks made on a barrel by the Government gangers. No one thinks of disputing the capacity of a barrel gauged by such an officer.

It appears to me that giving this prominence to the gas meter would help matters materially; for the consumer could, and undoubtedly would, watch its movements from night to night, and would know at all times the expense he was incurring for his gas supply—a satisfaction which certainly would at least be desirable. Another advantage gained would be that any leak through the day would be noticed and remedied at once. No groping through dark cellars to take statements would mean a much shorter time taken up in that work; and disputes about statements taken might be easily cleared up.

This meter should have one dial of not less than 8 or 10 inches in diameter, with three hands, and three circles of figures—the inner circle to represent one thousand cubic feet, and to state on its face that a full revolution of this hand represented the passage of one thousand cubic feet; the middle circle to represent tens of thousands, and to state on its face that a complete revolution of that hand represented the passage of ten thousand cubic feet; the outer circle to represent and to state the passage of one hundred thousand cubic feet for a full revolution.

The meter manufacturer who will make the first move in the direction of supplying a good ornamental meter, with as large a dial as that of an ordinary clock, so that any consumer may read it at a glance, will undoubtedly find a good demand for same among the gas companies of the country. I suppose no such meter will be brought forth by the manufacturers. They will go on making them as before, and gas companies will continue to place them in out of the way situations—thus strengthening the idea of their customers that "deeds of darkness shun the light."

From the meter we will pass to the employees detailed to take the meter statements—as these officials are sometimes the cause of much of the trouble between gas consumers and gas companies. The meter taker should be impressed with the idea that correctness in figures, and agreeableness in manners, go a long way toward smoothing the rugged paths of his employer, and constitute a stock in trade of no mean proportions. I think that they should be allowed to answer all questions relating to the statements of consumers' meters, not alone because it is well that they should do so, but simply for the reason that if the information be withheld the consumer would have greater reason for thinking the refusal was intended as a cloak to some obscure motive. No doubt the giving of the statements by such employees has many a time caused difficulties in the subsequent collection of the gas bills; for the meter taker, in his haste, may give the wrong figures. The ideal meter spoken of before would prevent these difficulties. The consumer could see for himself; and the common error of reading a meter one thousand cubic feet over or under would be less likely to occur.

The collector is the next personage who comes in direct contact with the consumer, and it is equally essential that he should be a man who has perfect control of his temper, and who has the happy faculty of understanding human nature in all its moods. A great deal depends on the tact of this employee in the matter of making the financial relationship of consumer and company harmonious. But after exhausting all efforts to please, he will find someone who cannot be convinced that his bill is correct, and who refuses point blank to pay it. Such a consumer will have to be turned over to the superintendent; and these, being the worst cases, will have to be treated very discreetly. Of course, you will promise to do all in your power to satisfy him. The first thing done, if it has not already been attended to, will be to have the statement retaken, and if it corresponds with the former reading, the next step will be to have the meter tested; but unless the consumer is present at the testing operation not much good will result. If testing should show the meter to be correct, the next move is to examine and test the house pipes. If no leaks are found, you make up your mind that the quantity of gas charged for has been burned; and unless this consumer is beyond the power of reason he will have reached the same conclusion. Some of them, however, will not be satisfied after all the trouble you have taken to convince them. They still refuse to pay—and order the meter taken off. These cases suggest the query—is it policy to sue in all such instances? To that I would answer, no. Use as much persuasion as is possible, and in all probability this same party will need your wares again; then he will settle up and try it once more.

The next thing to be considered in dealing with consumers brings us to the matter of discounts—how to be made, to whom, and when to be paid. The policy pursued by most companies is to have a sliding scale of discounts beginning at a fixed percentage for, say, one thousand cubic feet, the discounts increasing in percentage with the augmentation in consumption. This undoubtedly is a just way in which to deal with large consumers, and is similar to the plan pursued in all business transactions the world over. Nevertheless, this practice causes, in some cases, much feeling—particularly when the amount of gas consumed falls only a trifle below that quantity which entitles the user to a greater discount. Others, again, being small consumers, will make use of the expression, "Isn't my money as good as Mr. B's?"

who is a large consumer; and, "Shouldn't I be entitled to my proportion of discount?" Such arguments I presume have been brought to bear on most of the gentlemen present; and I hardly think they should be considered. All business men know (in spite of the fact that we consider one man's money to be as good as another's) that large consumers are entitled to lower prices on sound business principles.

In making these discounts to large consumers—who are usually storekeepers or proprietors of factories—should we add the proprietor's bill for the lighting of his private dwelling to his larger store or factory bill, and subject them both to the same discount? I think not, as the expense of supplying gas to private dwellings is usually much greater than in the case of the store or factory. Private dwellings are often remote from the central portion of the city, and are much farther apart. Each company has that sliding scale of discounts best suited to its own locality; and any scale common to all companies would probably be out of the question—although *could* it be done it would prove most desirable.

To ask *when* to allow the discount is, perhaps, superfluous, as nearly all would reply, "When the monthly bill is collected;" but would it not be better to arrange the discount in such a manner that the payment thereof should fall due at the end of the year, when the gas accounts are the heaviest, and when it would be more highly appreciated? Would it not tend to take off the sharp edge of the consumer's wail (when he receives his December's bill) if he found that the company was in his debt instead of appearing as his creditor? I may be wrong, but I think this a fair and reasonable way of allowing discounts; and I think the moral effect of the yearly discount would be much more strongly felt than if it were divided up into a dozen smaller figures.

Another way of smoothing the financial path of a gas superintendent would be to see that your customers have good and suitable burners; that their pipes are kept free from deposit; and to make any little desired changes in the location of the lights without presenting a bill for the work done? The cost of same would be compensated for by the extra amount of gas burned; and, greater than all, the consumer will appreciate that you are taking some interest in him outside of the fact of receiving his monthly payments.

In order to do this you will have to employ a man whose duties shall cover this field; and whatever salary such a man would receive, I make bold to say will not be money out of the company's treasury. Have all complaints looked into promptly, and their cause remedied. Such a course will tend to promote harmony and satisfaction between the consumer and company.

Still another thing can be done to help along the matter; and it is this. Publish in the newspapers of your respective cities the annual statement of your business; not merely giving a brief and condensed statement, but a detailed one. Let it show the improvements made, wages paid, receipts, dividends, etc. Let the public know that you have nothing to conceal, but that you are engaged in a business which is as legitimate and not more profitable than any other. This will set at rest the idea that gas companies are making fabulous profits—an idea which you all know *is* a prevalent one.

In brief, let us all make a grand effort to counteract, as far as we possibly can, the poisoned mind of the general public regarding gas companies—a poisoning very largely traceable to the arbitrary manner in which the gas business has been carried on in former years, or at the time previous to the advent of its rival—the electric light.

Discussion.

The President—Is there anything to be said on this topic. These papers can only be made of value by a free and frank discussion on their merits, added to a free exchange of views regarding the subjects treated on.

Mr. McMillin—If I am right Mr. Wood advocated that the discounts for the year's consumption should be made upon the presentation of the December bills.

Mr. Wood—That was it.

Mr. McMillin—It is a novel suggestion at least. I am not sure but that it is a good one.

Mr. Wood—We have tried it, and it seems to give satisfaction—especially to the large consumers.

The President—What would Mr. Wood do in the case of a consumer who began to use gas in January and discontinued its use in November?

Mr. Wood—I would figure the discount up to the time when he stopped burning. If he had paid his bills up to or at that time he would be entitled to the discount.

The President—For December I presume you would substitute the last month in which he was a consumer.

Mr. Wood—Yes.

Mr. McMillin—That is a good way to collect old bills.

Mr. Wood—Yes; it kills two birds with one stone.

Mr. Bowers—About two months ago I purchased a meter tester, being led thereto because many of our citizens were grumbling over their bills. We tested 75 meters. Out of the 75 I found only three fast; the other 72 were a trifle slow. It satisfied the customers that we were about right in our charges. The result was most satisfactory to one of our most important consumers—his meters would show a consumption of about 8,000 feet per month. He said he would not have believed the figures if we had not made the test.

Mr. Gwyn—I think the suggestion with regard to the use of larger meter dials is one of the best things in the paper.

Mr. McMillin—I have frequently made the same suggestion; and I have scarcely ever discussed the subject with a gas man who did not agree with me. We have probably a dozen meter manufacturers here, and I would like to hear, from someone who is engaged in the business, a statement of the reason why they have never made meters with large dials. Perhaps it may be a long while before meters with large dials will be in general use; but there are very many people who would be glad to have them. I think at least 25 per cent. of our consumers would be glad to adopt something of the kind, even if they had to pay something for it. Such a meter might be made quite ornamental. Perhaps it could be brought to the pitch of forming a neat center-piece for a mantel.

Mr. Hamlin—While Mr. Wood was reading his paper it occurred to me that many people entertain somewhat the same ideas about meters as they do about mules. No matter how gentle the particular mule may be, they class the beast under the general heading of "mule." So it is with them in regard to the gas meter; and in fact the more trouble you incur in the effort to convince them that the meter is a reliable instrument the stronger will their prejudice grow. They will be apt to repeat what the Cincinnati *Commercial* at one time said of the Cincinnati Gas Company—when the gas folks placed a lyre in front of the Exposition building—that the gas company might just as well substitute a meter for it.

The President—Perhaps I had better explain the *Commercial's* little joke. It is the practice of the gas company, during the time when the annual Cincinnati Exposition is held, to decorate the front of the Exposition building with some artistic device to be brought out by a gas flame. Upon one occasion (that of a musical festival) the gas company had a large and beautiful harp, or lyre, placed in front of the edifice. A pedestrian passing over the sidewalk on the opposite side of the street shortly after the device was illuminated, glanced up at the illuminated figure and said, "Hang those fellows; they need not have gone to that expense. Why didn't they put up one of their own meters? then they would have had the most perfect kind of a liar!"

Mr. J. M. Bate—The gentlemen appear to lose sight of an important item in this matter of ornamental meters, and placing them on exhibition in the parlors. Make them as ornamental as you like, but when it comes to the parlor end of the argument it must be remembered that it is often impossible when working around a meter—*i. e.*, when you wish to test it, replace it, etc., to prevent some escape of gas. I would like to put the meters in convenient places; but disagree with the parlor location idea. Sometimes I have placed them behind hall doors, but was soon requested to remove them—and all on account of a slight smell of escaping gas, either fancied or real. If we allow the slightest escape of gas to occur, we hear of it off and on for the next 12 months. I am equally opposed to stowing them away in the darkest corner of a littered-up cellar.

The President—Some prominent meter manufacturers are present. Perhaps they might be induced to speak on this subject. Some good reason may be known to them, but not understood by us, which makes the large dial plan impracticable.

Mr. McDonald—In response to that invitation I will give you an idea of the difficulties that would be encountered in constructing a meter with the large dial spoken of. Such plan of construction would necessarily involve an entire change in the internal arrangement of the meter. Further, the gearing would be greatly altered; and the expense of the measurer would be greatly increased. Indeed, this last item might be said to constitute the chief objection. I question very much whether the meter spoken of by Mr. Wood would not cost double that of the instrument at present in use.

Mr. Smallwood—The large dial would necessitate the construction of a greatly enhanced size of meter; and the change would also involve greater chance for damage, as the dial would be entirely exposed, were Mr. Wood's idea to be closely adhered to. As Mr. McDonald has said, the cost would be much greater. We now have a certain space between the gallery and the top of the meter into which our gearing fits very nicely. If we were to put on larger dials, we would have to increase the size of the gearing, and consequently would have to increase the depth from the top of the meter to the gallery. Suppose the change was made—it would still be a most open question as to the advantage gained. I do not think you will find one consumer out of a thousand who is able to read his meter—not because he cannot but because he will not learn to read it. He will not be taught; and in that fact do we find our greatest trouble. With reference to ornamental meters. We have only one consumer who has a decorated meter, and it certainly looks quite pretty. The great majority of our consumers, however, prefer to have their meters down stairs.

On motion of Mr. McMillin, a vote of thanks was tendered to Mr. Wood.

The President—The next paper to which we will listen is that submitted by Mr. J. Anderson, of Ironton.

Mr. Anderson then read the following on the subject of—

RETORT HOUSES AND BENCHES IN SMALL GAS WORKS.

Having been requested to prepare a paper on this subject, I may preface my remarks with the assertion that all practical gas men concede that the retort house department is the most important portion of a gas plant. In no other section or division of the establishment do we make closer connection with the important items and economies involved in production and yield—in fact, upon the intelligent management of the retort house does the major element of success in a gas works venture depend. In view of its importance how often are we surprised to find—in small gas works particularly—care and watchfulness superseded by neglect and indifference.

The reason, in some cases, is not hard to find. Speculators obtain franchises, and, not being competent engineers, or even mediocre architects they build the plants on too small a scale—satisfied with the closest possible attempt to supply the demands of the present, they will skimp the work in the attempt to make a quick turn of the dollars. Having disposed of their buildings and "rights" to subsequent purchasers, they seek other fields wherein to start anew, quieting their "consciences" with the remark, "It matters not who comes after; I am out." Most consoling these things must be to his successors.

On this basis of operation companies are started in with capitals ranging, say, between thirty and sixty thousand dollars. The speculative contractor retains a controlling interest in the shares, and then the citizens are invited to subscribe and pay for the remaining shares in cash. Between the citizens' cash and the contractor's credit the works are finally built and turned over to the company. The speculator's stock is in direct excess of the necessary capital expenditure; but he does not retain it long. He will unload it at 20, 50, and even a greater percentage of discount. His action depreciates the value of the "citizens' shares;" but that does not concern him in the least. He leaves the others to struggle on as best they can underneath the load, made all the more burdensome because the new controllers, having to charge high selling rates, must for the time be content with a light sendout.

Seldom does a gas works erected in any small town witness the expenditure on it of over eighteen or twenty thousand dollars—actual market value of the plant put in. In fact I know of several works, very limited in capacity and immoderately mean in structure, in which the benches are without foundation, and with purifiers not as big as a good-sized hamper, and every other portion of the plant in harmony with the features above cited.

The great reason why gas works construction, in small towns, is not subjected to even the ordinary competition that one of the residents of the very same place would call for if he were going to erect a small stable, is because the people are impressed with the idea that the contractor is the heaviest investor (?), and proposes to confer a public benefit upon the town—in consideration of which he must be allowed to share (!) the profits. Allowance must be made for their ignorance and gullibility, as our paper (The American Gas Light Journal) does not circulate in places non-illumined by gas light. With this preface let me treat of the first real item of my paper.

The Retort House.—A retort house should be lofty and sufficiently roomy to contain the plant, not only with the intent of allowing sufficient space for those who are to work therein, but also to permit of the erection of other benches when the hour for increasing the carbonizing capacity shall have arrived. Provision should be made for the location of a boiler to be placed at the end of the benches; and if a skeleton bench is not arranged for additional oven space should at least be allotted. The width of house should be ample to permit the range of benches to be built entirely clear of the rear walls, and the front space should be at least double the length of the retorts in use. I know of works which have only 12 or 13 feet space in front of benches carrying retorts 9 feet in length. In some of these narrow-laned instances new retort houses are badly needed, while in others the defect might be remedied by cutting a wide door in the house wall, in front of each bench, and constructing a porch or shed out from the opening. This last operation was performed by the writer at different plants, with acknowledged advantage—I might add that two of these latter are fair-sized establishments. I suggest the placing of the boiler at the point spoken of because, aside from that being the most convenient position, it is likely to receive the stoker's attention with that regularity which he bestows upon the trimming of the furnaces and the drawing of the retorts. The space in front of the benches should be kept as clear as possible to prevent any hampering of the workmen. There should be a complete supply of stokers' tools, buckets, barrows, water and luting material (where it is used) always conveniently at hand. The conveniences of the retort house have much to do with the proper working of the benches. Where all necessaries are supplied the time saved in changing charges exerts considerable influence on the life of a retort; and besides, good regulation can be observed, and less excuse exists for the men to slight their duty.

Benches.—Skeleton benches should be of the most substantial construction. Economy (supposed) in matters of material and workmanship is a mistake. The substitution of red brick where fire brick should be used insures a dead loss; there is no economy in the practice. Skilled fire brick masons should be employed on bench work. The rear and end walls of a range should be 27 inches thick; the center or pier walls 18 inches thick; the arches and entire interior should consist of 9 inches of good, hard No. 1 fire brick—in benches of sixes the rear and end walls might well be 4½ inches heavier. The arches should have from 15 to 18 inches of solid masonry over all. Work so constructed might ordinarily be expected to stand for 50 years; and the loss of heat by radiation in lighter structures is considerable.

In a paper* read by me at your last meeting I gave a brief sketch of the progress made in retort and bench construction since gas became an article of commerce. I then ventured to assert, as my humble opinion, that the D retort is not only the shape most generally encountered in use, but also claimed that it is the style best suited to our wants; and this statement gathers increased force when we remember that the general tendency inclines in the direction of employing enlarged carbonizing vessels. Round retorts could not be made of large capacity when placed three in height, because the upper one would be out of the stoker's reach. Oval retorts, as far as the 14″ × 22″ sizes are concerned, are not so objectionable; but a larger dimension of that shape would, in sixes, place the upper vessel beyond the reach of an ordinary man. With the Ross steam stokers in use, that objection would be done away with. Still, the days of steam stokers in small works are, I fear, not likely to soon appear.

The D retort certainly affords the shape in which greatest capacity can be conveniently attained; and there can be no denial made of the fact, considering the pressing necessity for economy in gas production, that the larger the capacity of the bench the cheaper will be your output charges. A works operating two or more benches of threes during the season of lightest output would make money by changing to fives or sizes. The economies secured would soon recoup the investment. There would be a saving of at least one fire in every two benches; I may average the saving in fuel at 35 bushels per day—which, rating the coke as worth 6 cents per bushel, means an aggregate daily money value of $2.10. Then it is also claimed that gas can be generated more quickly, and that an increased yield is secured from equal sorts of coal, when the larger benches are in duty.

The best plan of setting benches is a more difficult question to satisfactorily determine. The one in most general use in this country is that denominated by the title of "Sabbaton's open setting;" and for my part I subscribe to the view that it is the best system—at least where the firing is done under the ordinary method. Within the last few years the English bridge wall plan was brought to the attention of American engineers by the late Mr. E. S. Cathels—an engineer of some prominence. This plan is gaining favor in benches of sixes (although it has been applied to fives) both instances of its adaptation being generally in situations where regenerative furnaces are run. I think it is better suited to the requirements of regenerator furnaces than to the ordinary fireboxes. A stronger draught is required under ordinary firing. In regenerator furnaces, although the heat is intense, the fire is located at a considerable distance below the retorts—the heat is better diffused, and is more even; but, in the ordinary firebox, with the body of the fire in closer proximity to the material of the bench, the flame is drawn up, in a spurting, cutting sheet, on the face of the bridge wall and against the retort. They, in consequence, suffer greatly from this irregular play; and are rendered extremely sensitive to the sudden changes in temperature brought about by the opening of doors when the fires are replenished, or when clinkering is being attended to. Take it all in all, I adhere to the opinion that the Sabbaton plan is to be preferred to the bridge wall system in case the firing is done under the old style.

Regenerator Furnaces.—That the odds run largely in favor of improved furnaces is shown by the constant increase of interest manifested in the subject. Witness the avidity with which the subject is discussed at the Association meetings; as also the vast amount of correspondence, conference, and experiment which is being indulged in. Electric lights, oil, water and natural gases, gas improvement companies and wreckers have quickened the development progress in the business of gas manufacture; although it must fairly be added that the important improvements put forward in bench firing have not simply resulted as a consequence of the agitation above noted—mainly, they are the natural outcome of long years of study elucidated through careful and costly experiments the world over where gas is used. The question which the writer must here try to answer, however, is this—Are regenerator furnaces adaptable to and convenient for the needs of small works? A prevalent impression with many is that such construction or adaptation necessitates the erection of new double-stage retort houses. Not so; full regenerator furnaces may be put in any retort house which stands

*See Journal, June 2d, 1885, pp. 285-88.

on solid ground by simply going down about four feet beneath the old floor level. No building up about that; and I would not have half furnaces where I could put in full ones.

Does it pay to make the improvement? In the first place, the most experienced engineers assert that there is a gain in the production per pound of coal carbonized, and that the gas is produced more quickly. Putting these together, we note the fact that the working capacity of a given plant is largely increased. Next we have a saving in labor, and a decrease in the quantity of coke charged to firing account. To outline a simple example, let us take two benches of sixes over regenerators, the retorts being $14'' \times 26'' \times 9'$. These should produce, on a moderate average, 9,000 feet per mouthpiece; 54,000 feet per bench; or 108,000 feet in the two benches in 24 hours. It would take 21 retorts set in threes, with seven fires, on a fair average, to secure a similar result in the ordinary works fired on the old system. The two regenerators would probably consume 70 bushels of coke, and the seven fires under threes would absorb about 210 bushels of firing material. With coke at 6 cents per bushel, this would mean a money saving of $8.40 per day. In these figures I merely desire to make a close approximation for the purpose of evoking a discussion; and in fact I would rather leave the matter of precise figuring to the care of the gentlemen present, who can, if they will, state the results with precision.

It is true that regenerator furnaces cost more to construct than the older plans cost; but they will outlast two or three benches. The regenerator furnace is easier to work, and the bench stands over it longer than was the case with the common firebox; the stoker, having less demand made on his time, may pay attention to other duties; and the operation of clinkering (the most arduous task formerly exacted from the stoker) only takes place once or twice in a week, and is shorn of its terror, for the deposit is soft and is easily detached.

I have refrained from going into details as to plans of regenerators, as the able papers published in the JOURNAL not long since (in its report of the proceedings of the American Gas Light Association) amply cover that ground. The main question affecting us here is that of their adaptability to small works.

Discussion.

A Member—Mr. T. W. Foley, of London, has recently put in a regenerator furnace. Possibly he might be induced to say something with regard to it.

Mr. Foley—I can say the furnace has given good satisfaction during the last year.

Mr. Anderson—Does it give good heats?

Mr. Foley—Yes.

Mr. Anderson—How often do you clinker?

Mr. Foley—Twice a week.

Mr. Anderson—Is the clinker soft and easily removed?

Mr. Foley—Yes.

Mr. Anderson—Does it take more, or less, labor than two benches of threes on the old plan would absorb?

Mr. Foley—It takes less.

Mr. Anderson—Mr. McMillin is also running a furnace of that class.

Mr. McMillin—I have at other times said so much about this furnace question as to make me fear I have worn the subject threadbare. I would like to hear from someone else; and I have no doubt the rest of you have the same wish.

Mr. Hamlin—Apart from the intrinsic merit of Mr. Anderson's paper, I want to especially thank him for his mention of and reference to small works.

Mr. McMillin—What does Mr. Hamlin mean by *small* works?

Mr. Hamlin—Those operating two benches of threes.

Mr. McMillin—I know of one place where all the gas sent out is made in one retort; and I might add that I apply the regenerator principle under that one retort just as I do in a plant where there are a hundred retorts. It works admirably; and it is only by reason of being able to use a regenerative furnace that I am able to supply the gas with one retort. This retort takes the place of three that were in use before.

Mr. Anderson—I am glad that Mr. McMillin can indorse the regenerative furnace, even when applied on a scale as small as that spoken of by him. One would hardly look for a smaller example. My effort has been to show that works running two or three benches can adopt the regenerative furnace with advantage. In the first place, the saving of one or two fires is considerable where a demand for coke fuel exists.

On motion of Mr. McMillin, a vote of thanks was tendered to Mr. Anderson. At this point General Hickenlooper was summoned to Cincinnati, and Vice-President H. J. Reinmund assumed the chair.

(To be Continued.)

The Ionia (Ionia, Mich.) Gas Light Company reduced its selling rates on first of this month. We cannot give the figures.

[Concluded from page 195.]

Notes from the West.

By RETORT.

The St. Louis Combination.—The plan outlined is similar to those of the Standard Oil, the American cotton, and the Adams Express Trusts. It has passed and repassed between St. Louis and Philadelphia; and finally it was laid before the boards of direction, who formally ratified the plan, and agreed to the Board of Trustees, which consists of Gerard B. Allen, Chas. Parsons, C. H. Turner, and John J. O'Fallon, of St. Louis, and W. G. Warden, Thos. Dolan, and Henry C. Gibson, of Philadelphia. These trustees continue in office until next October, when the first election will be held, at which time four trustees will be elected to serve one year, two to serve two years, and one for three years. At all times four of the trustees are to be residents of St. Louis, and the trust is to last as long as the last trustee of the present board, whether he is in office or not, survives, and 21 years thereafter.

The plan is one of the most comprehensive that could have been arranged. It provides for a trust of at present $4,169,000, with the probability of its being increased to $8,000,000. The basis on which the three companies now stand is $3,300,000 for the St. Louis, $494,000 for the water gas, and $250,000 in stock with the lifting or cancellation of $125,000 in bonds, due in about a year, for the Carondelet. The valuation of the water gas is on the amount of money actually expended here, with $1,000,000 of bonds, very few of which have been issued, to go in with its assets and be wiped out of existence. This valuation of the water gas company will stand, but that of the St. Louis and Carondelet may be changed by the trustees, though not to be lower than now arranged. Any change in valuation that is made by the trustees will be on the demonstrated ability of the companies to create a revenue at the reduced price of gas, but if the Trust should be increased, as mentioned, to $8,000,000, the water gas company would receive share for share in proportion with the others. The Philadelphia syndicate also puts in $500,000 in cash for the purchase of such stock as does not desire to go into the trust. The apportionment is made on a valuation of $275 per share for the St. Louis stock, and $50 per share for that of the Carondelet Company. The proposition is for the stockholders to take trust certificates on that basis, or the cash ($275), as they elect, or to hold as it is. The former was accepted. The stock is all absolutely surrendered to the trustees, and receipts and certificates issued therefor, the time for surrendering the stock expiring April 25th, next, but the trustees having power to extend it to May 1st, but no later. After the stock is all surrendered, by which time the facts will be at hand necessary to making a calculation, the trustees will definitely fix values and the apportionment.

There will be no incorporation of the trust in any way. Each of the companies will preserve its identity and manage its works through its own officers; but all earnings go into a common treasury, and dividends will be declared on each alike. Each of the companies surrender all assets, all cash on hand, earned moneys of all character, and all rights and privileges, and the water gas company gives up its patents and franchises. The trust will be kept intact by the simple surrender of all stock, and the appointment of the trustees by the stockholders of each of the companies to transact their business. The holders of the certificates vote directly for the trustees in October of each year, and the trustees so elected have the power to elect officers, a President, Secretary and Treasurer, and fix the salaries to be paid to the same. The trustees, also, by proxy for the stock which they hold in trust, are clothed with the duty of electing the Boards of Directors to manage the different companies, and may elect themselves as such directors.

On its face it looks as if the water gas company has modestly provided for a small recognition of itself, but when it is taken into consideration that it has in the neighborhood of 4,300 shares of the stock of the St. Louis Company, for which it will draw nearly a million and a quarter of trust certificates, it will be seen that its own valuation, $494,000, will bring it up so as to leave the balance of power with the Carondelet. The $500,000 which it subscribes to trust certificates, to the surrender of stock held by people who do not desire to go into the trust, will bring it up to a control, but as yet no calculations of a control have entered into the matter.

The work of the trust will make rather an immense undertaking. In the first place, acquiring the water gas patents, the process of the St. Louis works will be changed at an early day, and it is probable that the Carondelet district will be supplied from the St. Louis works, and that the Carondelet will lay a main along Kossuth avenue to supply that territory. The cheapest process and methods will be employed in all cases, and, if it is thought that a cheaper service can be secured by having but one works, such works will be used, centrally located, the gas being sold to the companies to send through their mains. In case this is done reservoir stations will be provided, and also probably auxiliary works, to be used in case of accidents or explosions. The territory to be covered is too large to furnish from a central reservoir; so that, in any event, stations will be necessary. The present terri-

tory of the companies will be strictly maintained, and in the water gas district, where the contest will come in opposition to the Laclede, extensions of the mains and improvements of the service will be made by the water gas company, but under the direction and at the expense of the trust. The charter prices in the different districts will also remain the same, except as the condition of business may permit a reduction in Carondelet, and as the contest with the Laclede may require a temporary cut north of Washington avenue.

The Mechanical Equivalent of Light.

A European observer notes that the relations existing between mechanical energy and luminosity are for the present unknown; in fact, we know very little about luminosity and the factors on which it depends further than that one and the same body becomes the more luminous the higher its temperature. Nevertheless, we can, in some cases, determine the mechanical work which produces a certain intensity of light by deducting the sensible heat lost by radiation or otherwise from the total amount developed. Generally it is impossible to do so, but the incandescent electric light offers an opportunity for this investigation. Experiments have recently been made at the Technical High School, at Hanover, Germany, by Mr. Peukert, in this direction. The radiated heat was determined by a calorimeter filled each time by an exactly weighed quantity of water. The lamp was plunged into it and the water kept agitated. A thermometer, divided into tenths of degrees C., indicated the slightest changes. The losses were annulled by placing the calorimeter in an isolating chamber and keeping the surrounding air at about the same temperature as the water. The absorption of light by the liquid was ascertained by photometric measurements in both mediums while making use of Hefner-Alteneck's standard. The current was supplied by a Gramme dynamo of Schuckert's make, driven by an Otto gas engine; the difference of potential measured by a Siemens and Halske galvanometer. The current was determined by this instrument in combination with an exactly known resistance. Experiments with three kinds of incandescent lamps gave the following results:

	Difference of potential Volts.	Intensity of current. Lamps.	Heat absorbed by calorimeter. calories per hour.	Luminosity in the air. Candles.	Luminosity in the water. Candles.
Siemens-Halske....	98	0.554	35.7	8.8	8.1
Edison.....	93.6	0.963	55.26	16.9	14.4
Swan.....	76	2.55	124.19	30	28

The energy absorbed by an incandescent lamp is converted exclusively into heat and light, so that the portion corresponding to the luminous phenomenon can be ascertained with sufficient approximation by deducting the heat radiated from the total heat equivalent of the energy absorbed. An experiment was made which justifies this way of looking at the subject to some extent. An Edison lamp with a thin copper globe instead of glass was immersed in the calorimeter, when the heat found in the latter differed only by 2 per cent. from the calculated total. This would seem to show that rays of light intercepted are converted into heat. If the total energy is converted into calories the results with the three lamps will be as follows:

Lamp.	Total work per hour reduced to calories.	Calories absorbed— by radiation of heat.	Calories absorbed— by radiation of light.
Siemens-Halske..	46.98	35.70	11.28
Edison.....	78.01	55.26	22.75
Swan.....	167.86	124.19	43.67

Heating Retort Furnaces by Gaseous Fuel.

In a recent issue of the London *Journal* we find the following on the above subject from the pen of Mr. W. Backer. The article originally appeared in the columns of the *Journal fur Gasbeleuchtung:*

The system of heating retorts by gaseous fuel has now been known for many years, and ample experiments have been made with it; nevertheless there are still many establishments whose managers have not thus far seen their way to decide upon introducing this mode of firing retorts, which is certainly one that possesses many advantages for gas works. An explanation of this may probably be found in the fact that, as a rule, the most perfect structures involve the greatest outlay in the setting. The question here suggests itself whether it would not be possible, with less outlay, to obtain the same advantages that arise from heating by gas. On this subject I am desirous of offering some suggestions which may possibly not be practicable for large gas works, but may be worth consideration for those of small or medium dimensions.

Undoubtedly the simple methods of gas firing offer in many respects more security and greater advantages than large, complicated arrangements. It is quite true that of late it has been frequently asserted that simple constructions ought only to be employed where the best class of furnaces cannot be erected owing to the existence of underground water. But I am of opinion that every manager of gas works should examine the exact position, both from an engineering and a financial point of view, of the establishment under his direction, and before making his arrangements for its working. A good setting is quite practicable in places where it is impossible to construct deep foundations. To my mind those settings which require extensive excavations are only suitable for large works, and not for those of smaller dimensions, which are by far the most numerous. In fact, several years ago I expressed an opinion that every furnace should have its own grate, but that it is easy to arrange a common system of regenerators for several furnaces. It is not, indeed, requisite that the retorts should be placed over the furnace; they can very well (according to space and local requirements) be located behind it, or even outside the building. A construction of this kind has been in existence for many years at the works under my direction, and it has been introduced elsewhere with great success. I will state briefly the advantages as well as the drawbacks which result from such an arrangement.

Among the advantages I would mention, in the first place, the economy to be realized from the construction of one common system of generators for three or four furnaces, instead of having a separate one for each furnace. In most cases the existing main flue may be used, and it will then be found that the extra expense is but a trifle more than the cost of constructing a furnace with an ordinary grate. A further special recommendation of this kind of setting consists in the absence of any important changes of temperature arising from starting and letting down the furnaces, and the consequent immunity from damage and escapes of gas. There is hardly ever any need for repairs; and every furnace connected with this common system of generators can be put in working order with the shortest possible delay. If fired early in the morning it is capable of producing gas in the evening of the same day. We look in vain for such rapid results in furnaces of complicated construction. Lastly, by making use of this arrangement, with the introduction of steam, any irregularities in working are effectually prevented. The furnace can be used, one day with another, as long as the retorts are sound; and when these become useless, all that is required is to renew them. The grates and the arrangement of the generators remain in good order. It is quite true that without the introduction of steam a well regulated process of combustion is not to be obtained, and least of all if the coke used is of such a kind as to clinker readily and so interfere with the firing. In these cases the furnace draws a larger volume of air from the generators, involving a reduced production of carbonic oxide and a lowering of the temperature in the furnace. All these irregularities can be prevented by the introduction of steam.

The drawback which attaches to the system of firing which I have here described consists in a slightly increased consumption of fuel; but this is compensated in most cases by the reduced outlay for the first setting. We have only to consider the enhanced cost of a retort house, with the usual excavations, and we shall at once find that the accounts are about equal. Of course, this is different in the case of extensive gas works. Here it is essential to keep the retort house as free as possible, in order to allow of the laying of rails for the transport of coal, and other similar purposes.

Tank Delivery of Petroleum in London, England.

Engineering declares that the petroleum industry has made a fresh advance in the metropolis through the delivery of oil in tank wagons, which is apparently destined to deal a decisive blow at the old and cumbrous method of distribution in barrels. This is almost a final link in the chain of operations we have been long advocating, and although superficially insignificant, is essential to render the employment of tank steamers and pipe lines a complete success. For years the petroleum trade has been striving to rid itself of the incubus of the costly and unscientific barrel transport. The pipe line and the tank car were American innovations, while the cistern steamer with hydro-carbon furnace was brought to perfection in the Caspian. As is too commonly the case in England, the improvements in the United States and in Russia were steadily ignored, and it is only quite recently that the arrival of the Crusader with oil in bulk has given us the gratification of seeing at last adopted a system of transport so long and persistently advocated in these columns. Already preparations had been made for this innovation by Messrs. Ingall, Phillips & Co., who erected a very extensive series of reservoirs on the site of Dudgeon's shipbuilding yard, now in the possession of the London Oil Storage Company, without which, of course, it would have been impossible to have discharged the bulk cargo. When these two innovations of bringing the oil in tank steamers and pumping it direct into reservoirs on the banks of the river Thames had been accomplished, it became obvious that to give finality to the new system of bulk transport it was necessary to replace the barrel delivery in the metropolis by properly devised tank wagons, from which the oil, having been pumped from the reservoirs, could be pumped in turn into the storage tank of the retail tradesman. This innovation has been taken in hand by Mr. Edward Phillips, late of the firm

already mentioned, who has invented a wagon, divided into compartments of varied capacity, to allow of the accurate measurement of the fluid, and fitted with a pumping arrangement to be used when the oil does not flow by gravity into the place of storage. Similar wagons, although less ingenious than the one in question, have been in use some time in America, but they are a novelty in London, and the cost of delivery being largely lessened by abolishing the barrel they are certain to become before long a familiar feature in our streets. Moreover, legislative enactments are pending rendering the storage of petroleum in isolated tanks practically compulsory on the part of retail tradesman, and bearing in mind the danger arising from the barrels of oil, often leaking, exposed outside the dealer's premises, it is a wonder the authorities should have permitted the present unrestricted system so long. The rapid increase in the consumption of oil in this country, involving larger stocks, will doubtless induce the retail trade to adopt the tank system of delivery, and as this means abundant work to tank manufacturers and others in building tank wagons and storage tanks, we are glad to hear in these depressed times that the new system is to be carried out at once on a large scale.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Michigan City's Sudden Passion for Electric Street Lighting.—La Porte County (Ind.) probably encompasses within its boundary lines no busier district than that incorporated under the name of Michigan City. The waters of the great Lake Michigan pulse at its base, and the steel webs of two important railroads find a terminus in its broad avenues. Ease in communicating (both over land and water) with the busy marts of the East and West, combined with the possession of a plenitude of nature's gifts, attracted capital and labor to the favored spot, and as a result of the continued exertions of both, Michigan City thickened and spread. Looking at the place as it now appears, one would hardly incline to the opinion or belief that such solid growth could have taken place within a few short years; but the dwellers therein are stout in their assertion that the growth of the past is only trifling when compared with what the future is to reveal. Perhaps so; and we hope so. Nevertheless, common sense having dictated the policy which fostered the past growth, it is not quite so certain that a radical departure from the sound business lines which formerly prevailed is likely to constitute a safe road for future advance. The 6,000 persons who comprised the population of Michigan City in 1882 determined the time had come when their township should contain a gas works. In May of that year the Michigan City Gas Company was organized, and the delighted residents were loud in their promises of support. They wanted gas; the city's streets needed gas illumination; Mr. Blinks (President of the gas company) and his associates were possessed of great public spirit, etc., etc. The gas works were built, and the gas was turned on in due time. The schedule of prices—$2 to ordinary consumers, and $1.80 to the city—was eminently satisfactory, and the company was encouraged. When the city authorities finally settled upon the number of lamp posts necessary to meet the city's street lighting needs, Mr. Blinks concluded that promise and performance were as widely separated in Michigan City as in other less favored localities—in short, the "citizens," through their "disinterested" councilmanic representatives, declared that 30 lamps would "fill the bill" completely. The city was to purchase and own the equipment—all that was required from the company was the gas. No one could find fault with that arrangement—save that an onlooker might be excused for thinking 30 street lamps could hardly suffice for the public lighting needs of a place that contained a population of 6,000. In February of this year (in 1886 Michigan City loudly boasted that her residents numbered 10,000) the dwellers on the lines of two avenues (as yet unlighted) petitioned the Council to place lamp posts on the roadways mentioned in their prayer. At an outside estimate only 30 posts and lanterns would be required to meet the demands of the petitioners. These 30 posts, etc., would cost the authorities a total of $420—complete and ready for service. The annual expense for gas to same would be $18 each; repairs, lighting, extinguishing, etc., might be placed at $4.50 each; thus we would have an annual charge of—interest (7 p. c.) on $420, $29.40; gas, $540; repairs, lighting, etc., $135—or a total of $704.40 for the 30 posts. Add a similar sum for number of posts now lighted and we have an expense or charge of $1,408.80 for a street lighting perfectly satisfactory to the taxpayers of Michigan City.

When the petition reached the Council Mr. Krueger (a city father) betrayed great anxiety in the matter of desiring that his brother members should try electric light, and Mr. K. worked the scheme up to the point of having a special committee appointed (of which he was made chairman) for the purpose of making inquiry as to the probable cost of employing electric illumination on the streets. Mr. K. "worked hard," and the first fruit of his labor in the vineyard convinced him that Michigan City could be electrically lighted by a certain size of plant, the current from which would furnish an illumination equal to that to be gained were 200 gas lamps installed (of course Mr. Krueger figured his gas charges in a slightly different manner from that given above) and maintained; and that this illumination would cost, in round numbers, $2,500 a year. He explained that "the buildings and boilers now owned by the city could be utilized. More fuel would be required for boiler firing; but that was really the only extra cost to the city for housing and power." He forgot to make any allowance in the matter of depreciation on machinery, etc., and was rather generous (to his own side) in the matter of labor. However, Mr. Blinks overhauled Councilman K.'s statement; and even on the 200 gas lamp basis the former proved the city could save $754.40, if the latter's figures in regard thereto were accepted as correct. The Councilmen at this stage of the game appeared to be badly infected with the electrical fever, and each day but added to the disease. At the meeting held March 8th the electricians were on hand with their figures, and the following proposals were submitted: The Brush Company offered to put in a 30-light dynamo plant, with all other construction necessary for equipment of the service, for the sum of $4,831.67; the Thomson-Houston folks would furnish a 45-light plant—12 miles copper wire and artistic cedar poles—for $9,500. The last-named concern put in a supplementary proposition, offering to furnish a 30-light plant for $4,825. The United States agents wanted $7,500 for a 45-light plant; and, finally, the Jenney Company offered to supply and equip a 45-light plant (including 50-horse power engine) for $8,375. All these propositions were handed over to the streets and alleys committee of Council, with the understanding that the committee make report thereon at a special meeting of the Board to be held on March 11—three days were given them to dispose of the case. Messrs. Krueger and Vreeland "took a run up" to Indianapolis, and there inspected the Jenney system (Mr. Krueger was a "Jenney man" all through the discussion), which was quite successful in captivating their fancy. The committee then interviewed the agent for the Michigan City branch of the Jenney Company on the point as to whether he could not "revise" the proposition submitted; and the agent found, on "revising" his figures, that he "had made a mistake." Correction of the "mistake" reduced his proposition in the sum of $800, thus bringing it down to $7,575. It is noteworthy, however, that the Jenney folks did not find out the error until after the Thomson-Houston people had also "revised" their original bid. The latter discovered (when the bids had been read) that they had figured on "several miles excess" of copper wire. After extracting the "excess of copper wire" the original bid was brought down to $8,300, or $75 lower than the first Jenney proposition. The Jenney scheme was rushed through, and on the following morning the electric light committee of Council entered into a contract with the electric company, and the latter promises to have the lights in running order on or before May 1. As far as we have knowledge, not a single electric company offered to maintain a general electric lighting station in Michigan City. They one and all wanted to dispose of their wares outright to the authorities. And it is just a little strange, with the understanding that a total of 30 lights could be obtained from the city as a starting point, that some one or more of the suppliers of the light of the future would not be willing to glean in the general illumination field now controlled by the Michigan City Gas Company. It would be strange save and except for this one thing—the electric suppliers know where the profit in such ventures comes in, and that profit (they have had "inside opportunities" to form their convictions thereon) is made in selling apparatus instead of directly supplying light. How the Council can reconcile itself to the fact and belief that the city's interests have been best subserved by the action taken is a puzzle. If electric lighting was a necessity, why did the Councilmen not accept the Brush Company's proposition, and thus save nearly $2,600 to the city's treasury? Perhaps Mr. Krueger has had "inside opportunity" to become cognizant of the why; and at this distance it looks as if that worthy "could a tale unfold." At any rate, Michigan City is to take its rank among the list of those places whose taxpayers have been either befooled or betrayed by the ignorance or cupidity of those whom they selected to watch over their interests. In the meantime there is no danger the sheriff will be called upon to dispose of the local gas company's effects because of the withdrawal of the corporation's patronage; but it would not surprise us much did we at one time or another hear that anyone desirous of purchasing a second-hand Jenney plant (in fair order) could be accommodated by applying to the municipality of Michigan City, Ind.

Perhaps the Word "Limited" Should not be Applied to Their Business.—Messrs. Connelly & Co. (Limited), of New York and Pittsburgh, report that their spring trade has been of the liveliest sort, and it still "booms." Their specialties find continued favor with the gas folks; and as evidence the field in which their usefulness may be tested is extensive we submit the following list of places to which goods were shipped during the past 30 days. It will be noted that Modesto, Cal., and Marblehead, Mass., are "some miles" apart: Iron sponge shipments were made in the following quantities to gas works at the points noted—Louisville (Ky.) and Chicago

(Ills.) took six car loads each—and it rather looks as though Brothers Barret and Forstall were not to shut up shop just yet. Carload lots were sent to Consumers', of Jersey City, N. J.; Chesapeake, Balt., Md.; Troy Fuel Gas Company, Troy, N. Y.; Charleston, S. C.; Ohio Penitentiary Gas Works, Columbus, Ohio; and Macon, Ga. Less than carload lots went to Cottage City, Mass.; Bath, N. Y.; Wilmington, N. C.; Oil City and Pittston, Pa.; Alliance, Cadiz, and Fostoria, O.; Huntsville, Mo.; Clinton, Ia.; Modesto and Sacramento, Cal. Automatic governors were disposed of as follows: Central, of N. Y. city, took a 12-inch; Newport (R. I.) a 16-inch; Dubuque (Ia.) a 10-inch; Northern, of N. Y. city, an 8-inch and a 6-inch; an 8-inch to Lancaster, Ohio; and 6-inch instruments to Marblehead, Mass.; Little Falls, N. Y.; Athens. Ga.; Iowa City, Ia. Exhausters were distributed as follows: East End (Pittsburgh, Pa.) took a 10-inch; Mahanoy City and Sharpsburgh, Pa., as also Brunswick, Ga., were content with 6-inch capacities. Keep it up, Messrs. gas men; for the purchase of new apparatus looks like house-cleaning.

ANOTHER CHAPTER FROM "RETORT."—Our vigilant correspondent "Retort" is responsible for the following batch of newsy items: Gas matters are becoming badly mixed in Brother Forstall's district; and it must require considerable of his time, to say nothing of the tax upon his memory, if he desires to keep track of the new companies proposing to operate in Chicago. Within the last few days two ordinances have been submitted to the consideration and tender mercies of Chicago's Aldermanic Board. The first was a voluminous ordinance granting permission to the Economic Gas Company to maintain and operate gas works within the city, together with power to use all the streets, highways, alleys, etc., for its mains, pipes and "feeders." Sec. 6 of the ordinance gives the company power within one year from the passage of the ordinance to transfer and assign to another company all its rights in certain unspecified streets of the city, the readings being "west of —— street." Sec. 7 provides that the maximum charge for gas shall be $1.75 per thousand cubic feet. The other sections of the ordinance provide for the giving of bonds, and the indemnity of the city. The ordinance was referred to the Committee on Gas. Sec. 6 might be termed an emergency clause; while Sec. 7 might with propriety be referred to the Watkins-Forstall controllers of "dollar gas." The second "plaint" was offered by an "unknown citizen"—at least the directory fails to disclose who or what he is either in person or business; but common rumor quietly whispers that the "unknown" represents in reality some of the "retiring" aldermen.

A lively row is being kicked up over the Chicago street lighting contracts, and the said row ostensibly owes its vigor to a desire on the part of some to protect the taxpayer's interests; but, on the other hand, others allege that the rumpus is really intended to notify the gas companies "to call and fix things in the proper quarters." The *Tribune*, in a leading article, calls attention to the fact that, while gas is being sold to private consumers at the rate of $1 per thousand, the city pays $1.25 for the gas consumed in the public buildings and lamps; and the same authority then alleges that the companies actually receive only the former price on both classes of consumption, winding up with the admission, "that it is rather difficult to trace the other 25 cents."

Col. Ensley, of Memphis, Tenn., is also honored with visitors. On the 1st of the month his "callers" made proposals to the city authorities to supply gas at $1.75 per thousand cubic feet, and to give the city all profits over 6 per cent. per annum—the city to build new streets with said profits. The visitors include Katzenberger Bros., formerly of Cincinnati, Ohio. The New York Equitable Company's system of making gas is to be employed. The old Memphis Company, built nearly 40 years ago by Thompson Dean and others, offers to allow the city all the profit in excess of 8 per cent. per annum on its workings, and to reduce its selling rates to $2 per thousand—a reduction of 50 cents from ruling price. "Turn the rascals out?"

The freshets in the South are causing trouble to some of the fraternity, and a few of the plants close to large streams are in actual danger. Selma, Ala., is perhaps the most notable instance. Those companies dependent upon local coal mines in the area involved in the great railroad strike are suffering from lack of coal supplies. As yet none of the plants have stopped operations, but many are put to serious inconvenience on account of the threatened coal famine. RETORT.

MR. GEO. B. BURNS GIVES UP THE PRINCETON (ILL) LEASE.—Mr. George B. Burns has decided to surrender the leasehold under which he operated the Princeton plant. He asserts that the owners have placed the rental at too steep a figure to allow the lessee to recoup himself for the worriment involved.

ANOTHER VICTIM TO THE ELECTRIC CURRENT.—Meyers Patterson, a resident of Lynchburg, Va., is the latest victim of the perilous electric light wires. We have not the particulars concerning the nature of the accident, but suppose deceased was in the employ of the Lynchburg Electric Light Company.

CHESTER (PA.) GAS MATTERS.—The Chester Gas Light Company has reduced the price of gas to $1.70 per thousand cubic feet. The former charge was $2. The Company also offers (in case the quantity of gas supplied for public purposes equals or exceeds 250,000 cubic feet monthly) to supply the municipality at the rate of $1.50 per thousand.

STREET LIGHTING CONTRACTS SIGNED AT LAST.—It is understood that the Lamp Committee of the Brooklyn (N. Y.) Aldermanic Board "have seen" their way to adjusting the street lighting contracts for 1886. The prices on which the awards were made show slight (if any) difference from those of 1885. The contracts should have been entered into at an early date in January; but, perhaps the "negotiations" were of an extremely delicate nature this year, hence the delay.

PRICE OF GAS REDUCED AT BORDENTOWN, N. J.—Mr. J. O. Hudson, Supt. of the Bordentown Gas Light Company, informs us that his directors have authorized him to publish the following schedule of rates. The new prices apply to all bills rendered from date of May first, but the gross figure of $2.35 will be exacted in case accounts are not liquidated within ten days from date of presentation.

Monthly Consumption Quantities.	Net Rate per M.
1,900 cu. ft., and under	$2.20
2,000 " to 4,900 cu. ft.	2.10
5,000 " and over	2.00

Mr Hudson asserts that if the people of Bordentown will help the Company in its efforts to extend its business, another reduction is sure to follow.

CHEAPER GAS FOR SEWICKLEY, PA.—Mr. Jas. Forbes, Supt. of the Sewickley Gas Company, does not believe in charging high rates for gas, and indeed he would have little excuse for such a course when one remembers that his "coal must come pretty low." However, his Company has done remarkably well by its patrons, when all the circumstances attending the matter of Sewickley's gas supply are looked over. Hereafter the Sewickley Company will charge a gross price of $1.70 per thousand, and prompt payment will entitle the consumer to a rebate of 20 cents from the gross rate.

THE LIGHT OF THE FUTURE VENTURES INTO "JEWELRY TOWN."—The managers of the Schuyler (Hartford, Conn.) Electric Light Company have established a station in Brother Pratt's district at North Attleboro, Mass., and we understand that the Schuyler folks were to be in readiness to turn on the current on the evening of April 5th. The electricians claimed to have secured lighting contracts from the proprietors of 30 shops in "jewelry town"—North Attleboro's "other" name—the contracts to cover a period of one year. We are unable to give the figures at which the electric illumination is to prevail; but "arcs" are to do the work. It is quite likely that the Schuyler people will make an attempt to secure the street lighting, and then some idea may be formed as to what sum the shopkeepers are paying. The monied men of North Attleboro refused to invest in the Schuyler scheme, so the enterprise may be looked upon most impartially by the residents of the place—and if dividends are not earned on the shares of the "foreign corporation" no jewelry-town man's pocket will suffer in consequence.

FLOOD TROUBLES IN THE SOUTH —The closing days of last March, and the first week or so of the present month were made rather perilous, to those located in close proximity to the waterways of the South and West, on account of the dangerous height attained by the waters in "Nature's feeders of the open seas." From the reports that have reached us through the medium of the daily press accounts it appeared as though the gas men at Chattanooga, Tenn., and Selma, Ala., had suffered most from the rushing waters; and, in order that we might have authoritative information concerning the real extent of the damage done to the gas plants at the cities named, notes of inquiry were addressed to the gentlemen in charge of the respective plants. In due time a reply was received from Mr. J. T. Lynn, Sec. and Supt. of the Chattanooga works; but we fear, owing to Mr. Harthan's silence, that Selma must have suffered considerably. On the other hand, though, it may be that the press accounts in regard to Selma were rather highly colored; and, remembering the old saying that "no news is good news," we sincerely hope Mr. Harthan's failure to reply is based on the ground that the damage to his plant was so slight as not to be worth reporting. From Mr. Lynn's letter we learn that on the night of April 3d the water in river had gained a height of 52.18 feet, or before the highest point in flood was reached. An altitude of 48 feet would ordinarily enable the currents to enter the retort house; but by dint of hard shoveling a hastily formed levee kept the water back from the fires up to the 51 feet point of rise. Darkness prevented the levee work at that juncture (Friday 2d), and the currents poured over the dam, finally rising in the retort house up to the middle retorts in the benches of sixes—or an altitude of 5 feet 6 inches above the ashpans. Gas was then shut off from the city; but one of the holders still contained 60,000 cubic feet. On Sunday (April 4) the ebb set in during the day, and Monday the mains were pumped out, and gas was again furnished to the consumers on the evening of the 5th. The pecuniary loss sustained through damage to plant was very slight—loss of time, vexation (both to company and consumers), etc., being the chief causes for complaint. The opposition (water gas) company shut down on Thursday (April 1st), and did not recommence operations until the following Tuesday. We congratulate Mr. Lynn upon his celerity, and the company upon the fact that its loss was so slight.

The Market for Gas Securities.

The city gas share market during last fortnight exhibited no unusual or disturbing feature. Consolidated gas attracted some attention and fluctuations were confined to a narrow range. The stock exhibited marked strength, however, and one or two small transfers were recorded at slightly above par and ten. At hour of writing (2:30 P.M., April 14) the market shows a slight falling off from highest previous quotation. Sales have just been made at 109, while room bidders are offering 108½, with offerers holding out for 109½. The legislative doings are watched with much eagerness, and it is barely possible that Consolidated might prove a good short sale at any figure between 110 and 106 within the next ten days. We do not advise that investment holders should try the "shorting" experiment; but we do expect that a temporary decline will take place shortly. The intrinsic value of Consolidated is greater now than ever before, and we incline to the view that a temporary depression will occur simply in consequence of the thimble-rigging at Albany. Other city shares are held at firm figures. Metropolitan, of Brooklyn, is now quoted at 98 to 100—an advance of two points. Old Brooklyn is also firmer. In fact the Brooklyn situation is all in favor of the shareholder. A hitch has occurred in the Jersey City situation, in the shape of legal proceedings; but it is measurably certain that, sooner or later, the watering pot will be called into requisition. Orestes Cleveland, mentioned in our last as contemplating the erection of an opposition works at Hoboken, N. J., was elected Mayor of Jersey City on Tuesday last. Washington (D. C.) gas is firmer. We have no late advices from St. Louis, Mo. The general situation is favorable. At auction, 66 shares Yonkers, at 51; 155 shares Tarrytown and Irvington, at 60.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks.

16 Wall St., New York City.

April 16.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	108½	109
Central	440,000	50	70	—
" Scrip	220,000	—	47	57
Equitable	2,000,000	100	158	160
" New Stock			150	155
" Bonds	1,000,000	—	107	110
Harlem, Bonds	170,000	—	—	—
Metropolitan, Bonds	658,000	—	113	—
Mutual	3,500,000	100	137	138
" Bonds	1,500,000	1000	104	107
Municipal, Bonds	750,000		—	—
Northern	125,000	50	50	—
" Scrip	108,000			
Yonkers		50	51	55
Richmond Co., S. I.	300,000	50	—	92
" Bonds	40,000	—	—	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	129	130
Citizens	1,200,000	20	87	89
" S. F. Bonds	320,000	1000	106	110
Fulton Municipal	3,000,000	100	160	161
" Bonds	300,000		104	108
Peoples	1,000,000	10	85	86
" Bonds	290,000	—	106	107
" "	250,000	—	103	—
Metropolitan	1,000,000	100	98	100
Nassau	1,000,000	25	132	133
" Ctfs	700,000	1000	101	102
Williamsburgh	1,000,000	50	160	162
" Bonds	1,000,000	—	112	114

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